

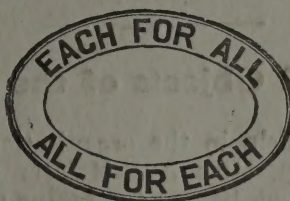
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## SELF-HELP NOT CHARITY

## AT

**Milki (Badamtola) near Serampore (Hooghly).**



"The gospel of good health should be the first one for all nations—not the last as now too often it is."

"I strongly advocate that all mosquitoes and not only 'Anopheles' should be placed under still more close control by public action. The cost of banishing them is small compared with the benefits of doing so."

RONALD ROSS.

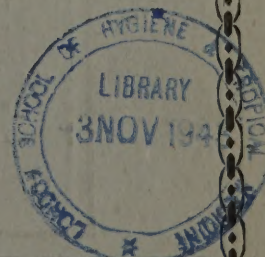
President :

**S. K. HALDAR, Esq., I.C.S.**

Commissioner, Burdwan Division.

**OFFICE:**

**1/2A, Prem Chand Boral Street,  
CALCUTTA.**





# The Central Co-operative Anti-Malaria Society Ltd.

Registered under Act II of 1912 on 5th July 1919.

**T**his Society is a purely non-official organisation founded for improving the sanitary and economic condition of the villages of Bengal and is supported by voluntary contributions. It has been duly registered under the Co-operative Societies Act and its funds are under Government audit. It may receive unconditional grants from philanthropic people, public or local bodies and the Government. It is neither a charitable society nor does it support a charity-fed one. The Society is guided by its duly elected Board of Directors according to its byelaws. At least one-third of its directors are co-opted from rural anti-malaria societies.

## Aims and Objects of the Society.

- (1) To organise or help in the organisation of a net-work of autonomous Co-operative Anti-Malaria and Public Health Societies throughout Bengal for taking preventive measures against epidemic diseases and to group these rural societies together for effecting larger sanitary measures and medical relief.
- (2) To initiate and guide rural societies, to take preventive measures against Malaria, Kala-Azar, Cholera, Small Pox, Tuberculosis, Leprosy and other preventible diseases and to make sanitary improvements of their respective villages.
- (3) To carry on propaganda work in furtherance of the aims and objects of the society.
- (4) To provide for a regular and efficient system of guidance and supervision over the rural societies as far as funds permit.
- (5) To act generally as an expert advisory body and guide to these Public Health Societies and to further their interests in every way without assuming any controlling authority.
- (6) To organise branches of this Central Society if possible at suitable centres such as District or Subdivisional headquarters for furthering the objects of the society.
- (7) To co-operate with organisations having similar objects.



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# The Central Co-operative Anti-Malaria Society Ltd.

Registered under Act 11 of 1912.

Founded:—8th April 1919.

Registered:—5th July 1919.

Patron :

**Dr. Rabindra Nath Tagore, D. LITT; N. L.**

## Board Of Directors For 1939-40.

1. Miss Josephine MacLeod.—*President.*
2. Dr. Tinkari Ghose, B.A., L.M.S., F.C.S. (Lond.)
3. Mr. K. L. Goswami, B.A., M.L.C., *Vice-Chairman*, District Board, Hooghly & *Chairman* Serampore Municipality.
4. Rai Dr. G. C. Chatterjee Bahadur, M.B., Hon. F.R.I. (Lond.)  
*Hony. Secretary & Hony. Treasurer.*
5. Rai Dr. Hira Lal Sinha Bahadur, B.A., L.M.S., (Bhastara, Hooghly.)
6. Babu Sailaj Lal Chatterjee, B.L., (Nimta, 24 Perganas).
7. Babu Sailendra Nath Banerjee, B.L. (Bhadrakali, Hooghly).
8. Babu Dwijendra Nath Dutta, M.A., B.L. (Devanandapore, Hooghly).
9. Sk. Eunash (Shelimabad, Burdwan).
10. Babu Tarapada Sen, B.L. (Natagore, 24 Perganas).
11. Kumar Sanat Kumar Mukherjee, Zemindar, Uttarpara, Hooghly.
12. Mr. Amarendra Nath Mukherjee, Zemindar, Uttarpara and Member, District Board, Hooghly.
13. Capt. J. D. Sinha, M.R.C.P. (Edin), D.P.H. (Cal),  
Asst. Director of Public Health, Malaria Research, Bengal,—nominee of the Director of Public Health, Bengal.



14. Mr. Bishnupada Bhattacharya, M.A. Asst. Registrar of Co-operative Societies, Calcutta & 24 Perganas—nominee of the Registrar of Co-operative Societies, Bengal.

*Joint Secretary.*

Dr. Amulya Nath Mitra, M.Sc., M.B.

**THE BOARD MET 4 TIMES DURING 1939-40.**

### **Honorary Organisers:**

1. Babu Jugal Pada Sen.
2. Dr. Tusto Charan Ghose.
3. Babu Satya Narayan Batabyal.

### **Advisory Committee:**

1. Rai Bahadur Dr. G. C. Chatterjee—*President.*
2. Dr. A. N. Mitra, M.Sc., M.B.—*Secretary.*
3. Dr. Nonilal Ghose, M.B., D.T.M.—*Kala-Azar Officer.*
4. Dr. Nagendra Nath De, M.B. (Cal.), D.P.M. (Lond.),  
M.R.C.P. (Edin.),—*Publicity Officer.*
5. Babu Kshetra Nath Banerjee.
6. Babu Jugalpada Sen.
7. Dr. Tusto Charan Ghose.
8. Dr. Bhupati Nath Mitra, M.B.

**THE ADVISORY COMMITTEE MET EVERY TUESDAY & FRIDAY AT 8 P.M.**

**Development of Societies**

YEAR.	Number of Societies Formed.	Total Registered.
1917	2	0
1918	3	1
1919	4	2
1920	19	4
1921	21	8
1922	31	9
1923	85	19
1924	384	29
1925	500	43
1926	869	263
1927	1,090	444
1928	1,236	566
1929	1,367	668
1930	1,434	769
1931	1,640	868
1932	1,730	907
1933	1,855	927
1934	2,000	940
1935	2,064	931
1936	2,117	985
1937	2,198	1,024
1938	2,281	1,045
1939	2,362	1,091
1940	2,389	1,112

**Total Number of Co-operative Anti-Malaria Societies  
District by District on 31-12-1940.**

**Burdwan Division.****Rajshahi Division.**

Dist.	Total No. of Soc.	Total Regd.	Dist.	Total No.	Total Regd.
Burdwan	208	131	Rajshahi	78	56
Birbhum	75	32	Malda	22	21
Bankura	45	30	Dinajpur	14	7
Midnapore	123	64	Jalpaiguri	4	0
Hooghly	243	154	Rangpore	17	6
Howrah	97	41	Bogra	16	6
			Pabna	77	30
			Darjeeling	2	2

**Dacca Division.****Presidency Division.**

24 Parganas	305	100
Khulna	283	166
Jessore	216	84
Nadia	189	54
Murshidabad	32	9

**Chittagong Division.**

Dacca	32	9
Mymensing	24	4
Faridpore	140	41
Bakharganj	50	5
Chittagong	31	8
Noakhali	68	45
Tippera	33	7



OF

### Sir Kailash Gold Medal :—

- ### Bijoy Sinha Medal (Silver)

- ### Do. (Surgical Pocket Case)

- Do. (Gold Medal)**

- |      |  |
|------|--|
| 1925 | Babu Pulin Chandra Gangooly, (Jotegiri, Howrah)    |
|      | (deceased)   |
| 1926 | ,, Kshetra Nath Banerjee (Nimta, 24 Pergs.)        |
| 1928 | ,, Jugalpada Sen, (Subalpore, Hooghly)             |
| 1929 | ,, Sailendra Nath Banerjee, B.L.,                  |
|      | (Bhadrakali, Hooghly)                              |
| 1930 | ,, Kali Kumar Mitra, (Ghargoal, Hooghly)           |
| 1931 | Dr. Tusto Charan Ghosh, (Panchghora, Hooghly)      |
| 1932 | Babu Joygopal Sarkar, (Rewee, Khulna)              |
| 1933 | ,, Kunja Behari Sardar, (Sardarati, 24 Pergs.)     |
| 1934 | ,, Makhan Chandra Chowdhury, (Haripur, Pabna)      |
| 1935 | Dr. K. P. Mukherji, M.B., D.P.H., (D.H.O., Howrah) |
| 1936 | ,, A. K. Sarkar, M.B., D.P.H. (D.H.O., Faridpur)   |

**Sir Hariram Goenka Gold Medal :—**

1924 Babu Sunit Kumar Banerjee, (Ghola, 24 Perganas)

**Dr. Bentley Gold Medal :—**

1925 Pandit Patiram Roy, (Kanthaltola, Khulna)

1931 Babu Bama Pada Ghosh, (Dafarpore, Howrah)

1932 Dr. Kunja Behari Chowdhury, (Nityanandakati,  
24 Parganas)

**Willcocks Gold Medal : Awarded by Babu P. C. Coomar (deceased)**

1932 Babu Monmatha Nath Mitra, (Kalachara, Hooghly)

1933 „ Fani Bhusan Banerjee, (Barihaty, Hooghly)

1934 „ Gobardhan Pal, (Porabazar, Hooghly)

1936 „ Jugal Kishore Mukherjee, (Ellipur, Hooghly)

**Stethoscopes :—**

1924 Dr. A. K. M. Abdul Wahed, M.B., B.Sc., M.M.F.

„ Raghunath Chatterjee, M.M.F., (deceased)

**Silver Medals :—To the best medical volunteers :—**

1924 :—1. Drs. Makhanlal Mukherjee 2. Haripada Ghose  
3. Barada Kanta Roy 4. Prafulla Kumar Bose 5. Pramatha Nath Paul  
6. Saurendra Mohan Biswas 7. Jnanendra Nath Santra 8. Jogesh  
Chandra Karmakar 9. Nirmal Chandra Das 10. Bhajahari Das  
(Chota Bankra) 11. J. M. Sen Gupta (Rohanpore).

1935 :—1. Drs. Tusto Charan Ghose 2. Kali Prasanna Roy  
3. Debendra Nath Das 4. Harihar Sanyal 5. Nagendra Nath Palit  
6. Pabitra Chandra Sarkar 7. Gopal Mazumdar 8. Priya Lall  
Sen Gupta 9. Md. Golam Nabi 10. Provash Chandra Banerjee  
11. Jnan Sankar Das Deb 12. Upendra Nath Ghose 13. Prankrishna  
Mukberjee 14. Kanchan Bhusan Dutta.

1926 :—1. Drs. Lalmohan Saha 2 Arun Chandra Barua 3 Kailas  
Chandra Mazumdar 4 Hem Chandra Samaddar and 4 others.

1928 :—1 Prosad Das Banerjee 2 Balaram Dutta 3 Ramendra  
Nath Kundu 4 Hirendra Nath Dutta 5, Suresh Chandra Chowdhury  
6 Kshitish Chandra Mazumdar 7 Hemendra Narayan Chakravarty  
8 Haraprasanna Bhattacharya.





1929 :—1 Dr. Suresh Krishna Talukdar, L.M.F. 2 Panchu Gopal Samanta 3 Dr. Gour Chandra Kolia, L.M.F. 4 Dr. Hiralal Ghose 5 Dr. Manindra Nath Goswami, L.M.S.

1930 :—1 Md. Ejaharali Biswas (Bharukhali) 2 Ashutosh Sarkar (Jasai) 3 M. O. Dogachi (Pabna).

1931 :—1 Dr. Kalipada Gangooly (Sardarati) 2 Sashibhusan Sardar (Sardarati) 3 Ram Chandra Naskar (Bhadrakali) 4 Satish Chandra Ghose (Kamdebepore) 5 Kishori Mohon Chakrabarty (Boral Satghora) 6 Late Moulavi Abdul Bari (Baligari) 7 Haripada Kumar (Naity) 8 Guru Prosad Ghose (Naity) 9 Bankim Behari Ghosh (Naity) 10 Sailendra Nath Chatterjee (Naity) 11 Panchanan Ghose (Pairagacha) 12 Keshab Ch. Ghose (Pairagacha) 13 Butto Kristo Mitter (Kalachara) 14 Sachipati Roy (Kalachara) 15 Sushil Ch. Bhattacharya (Boluhaty) 16 Sushil Ch. Kumar (Boluhaty) 17 Moni Bhusan Ganguly (Boluhaty) 18 Subodh Chandra Mukherjee (Boluhaty) 19 Bhadreswar Ganguly (Jotegiri) 20 Late Krishnadhane Ganguly (Jotegiri) 21 Bishnupada Mondal (Jotegiri) 29 Paresh Chandra Ghosh (Dafarpore) 23 Krishna Prosad Ghosh (Dafarpore).

1932 :—1 S. Ananthnath Chatterjee (Borai) 2 Surendra Nath Das (Debanandapur) 3 Fanindra Nath Rishi (Debanandapur) 4 Probodh Ch. Mukherjee (Naity) 5 Gour Mohan Dutta (Subalpur) 6 Guiram Chakrabarty (Antpur) 7 Sushil Kumar Chatterjee (Bansdaha) 8 Md. Fouzdar Rahman (Howalkhali) 9 Ajit Kumar Banerjee (Boluhaty) 10 Upendra Krishna Samanta Ray (Bhogpur).

1933 :—1 Munshi Golam Sarwar (Ghuni) 2 Amulya Charan Banerjee (Madhabkati) 3 Ambika Charan Mondal (Beanta) 4 Dr. A. K. G. M. Golam Rasul (Kaliani Chhoygharia) 5 Sachindra Nath Bhattacharya (Sanitary Insp., Hanskhali) 6 Manik Gupta (Goralgacha) 7 Haridhone Ganguly (Sukchar) 8 Jotindra Nath Mukherjee (Telihaty).

1934 :—1 Mahadeb Roy Chowdhury (Birati), 2 Ramanath Mondal (Hederhati) 3 Dr. Panchanan Batabyal (Sandhipur) 4 Dr. A. K. M. Motiar Rahaman (Kaliani), 5 Guru Prosad Pal (Sany : Insp ; Hooghly), 6 Bholanath Banerjee (Chandbati) 7 Gopal Chandra Pal (Baligori) 8 Satish Chandra Malik (Gobindapur).



1935 :—1 Babu Nalin Behari Bose (Sanitary Inspector, Moheshpur, Jesore) 2 Babu Shiba Prosad Roy Chowdhury (Moheshpur) 3 Babu Amulya Ratan Bose (Madhabkati) 4 Babu Godadhar Nayak (Kasba) 5 Babu Amar Nath Palit (Sanitary Inspector, Hooghly) 6 Babu Makhanlal Bose (South Kotwali, Faridpur) 7 Mv. Golam Ahiya (Pakdah, 24 Pergs.).

1936 :—1 Babu Satya Ranjan Mukherjee, (Sanitary Inspector, Howrah) 2 Babu Anath Nath Mitra, (Sanitary Inspector, Hooghly) 3 Dr. Arefar Rahman, L.M.F. (Rakasherpar, Tippera), 4 Babu Girish Chandra Koley (Sanitary Inspector, Howrah) 5 Babu Nanilal Bose (Sanitary Inspector, Khulna).

### **Abinash Gangooly Memorial Medal.**

1929 :—Sisir Chandra Bhattacharya (Natagore).

1930 :—

## Foundation of the Central Co-operative Anti-Malaria Society Ltd.

### History of Anti-Malaria Movement in Bengal.

Ronald Ross's epoch making discovery regarding transmission of malaria to human beings through the bite of infected anopheline mosquitoes was made in Calcutta in 1898 when Dr. G. C. Chatterjee, the Founder Secretary of the Central Co-operative Anti-Malaria Society Ltd., had just begun his service as a House Physician of the Calcutta Medical College Hospitals and had occasions to supply materials to Ronald Ross for his research work. Later on when Dr. Chatterjee was posted at the Pathology and Bacteriology Laboratory of the Medical College, he took special interest in the malaria problem as this was the greatest scourge of Bengal, most of its old and prosperous villages and towns being gradually depopulated and overgrown with jungles due to ravages of this fell disease. He devoted his leisure hours in the study of mosquitoes and malaria parasites in the laboratory as well as in his own village and elsewhere and studied systematically all publications on anti-malaria operations that were carried out in different parts of the world.

In course of time, he came to know of the marvellous success achieved by Col. Gorgas in stamping out malaria and yellow fever from the Panama Canal Zone and of Sergeant brothers in checking malaria in Algeria by taking proper anti-mosquito measures on the lines suggested by Sir Ronald Ross. Having a keen interest in improving the sanitation of his own village, although Dr. Chatterjee had already initiated improvements of the drains by putting in bed-bars and gradual filling up of insanitary ditches of his village through the Panihati Municipality, of which he was an elected Commissioner, he was not able till then to stamp out the disease owing to several difficulties not within the scope of the municipality. He felt the necessity of creating public opinion for which he delivered several lantern lectures on "Malaria and methods for its prevention" in his village and in the neighbourhood. In order to create an interest among the medical practitioners of Calcutta, he delivered a lecture



on "Preventible diseases in Lower Bengal" at the Calcutta Medical Club in 1908. In 1912 with the collaboration of Mr. Chittasukh Sanyal, B.E., (Retired Engineer) and Dr. Sarashi Lal Sircar, M.A., L.M.S., (Retired Civil Surgeon), he created the Anti-Malaria League and the office of the league was located at the Medical Club premises at 72, Harrison Road, Calcutta. The league published several pamphlets in Bengalee and English on malaria, which were distributed in the rural areas and lantern demonstrations were given at suitable centres.

In 1913 about 450 people died of malaria at Panihati within 3 months. The people then realised the necessity of taking anti-mosquito measures in the village. The nucleus of the first village anti-malaria society on co-operative basis was formed in Panihaty in 1914, but the society was not incorporated under the Act, till March 1918. Two more societies were organised in the neighbouring Sukchar and Sodepore wards of the same municipality soon after, which did valuable work in connection with prevention of Malaria, Cholera etc., by paying voluntary contributions and they employed a medical officer jointly on subsidy basis. On the successful working of these 3 societies for one year, foundation of a central organisation at Calcutta for creating and guiding anti-malaria societies on similar lines all over rural Bengal originated in the mind of Dr. C. A. Bentley, the then Director of Public Health, Bengal and the Central Society was organised in a public meeting held at the Ram Mohan Library Hall, Calcutta on the 8th April 1919. A committee was appointed to draft the byelaws and the Central Co-operative Anti-malaria Society was registered under the Act on 5th July 1919, under the able guidance of Mr. J. T. Donovan, I.C.S., the then Registrar of Co-operative Societies of Bengal.

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## AN APPEAL.

The short summary of the diverse activities of the Central Co-operative Anti-malaria Society, Ltd., given in this report must appeal to those who have interests in the welfare of Bengal, specially in the problem of the eradication of Malaria and improvement of its decadent rural areas. With a view to improve the health and agriculture of Bengal by flushing the country with valuable silt-laden flood water during the rains and for resuscitation of the dead or dying rivers and other water passages by the voluntary efforts of the people, the Central Society organised conferences at different places where several resolutions were passed; the people have now realised the value of this movement and have already carried out valuable works in different areas with their own resources. The Irrigation and Public Health Departments of Government have since taken up several small schemes in right earnest and are helping the societies to the best of their power.

The Central Society has been trying to place in the hands of the rural people results of the latest researches on prevention of malaria and other epidemic diseases, that are practicable in this country.

During the last 21 years, the Central society, in trying to organise a net-work of anti-malaria societies throughout Bengal have convened conferences at suitable centres in order to encourage the local societies and to co-ordinate their work. But for its slender resources, it has not been able to organise more than 2389 societies among 86,000 malaria stricken villages in Bengal, although many societies are in the course of formation and we are not posted with informations about all the societies.

The accounts of the society for the last few years reveal steady fall in contributions for which the society has not been able to push its activities. The society has no endowments and runs mainly on contributions from Government and philanthropic people and organisations.

We, therefore appeal for generous financial support from everybody, so that the society may continue to carry on the useful work, it has been doing for improving the health of villages in Bengal.

Any contribution however small will be thankfully received.

G. C. CHATTERJEE,

*Hon. Secretary.*



THE CENTRAL  
CO-OPERATIVE ANTI-MALARIA  
SOCIETY LIMITED.

Secretary's Report.

1939-40.

In consonance with the previous policy, which we find no necessity for changing, in presenting the annual report of the Central Co-operative Anti-Malaria Society Ltd., to the Board of Directors, the Hony. Secretary incorporates with it, a resume of recent works available to us, both research and field, on malaria problem throughout the world, in order that the 3,000 or more rural societies, who carry on their self-imposed task in their respective villages, by their own fund, may judge, for themselves, whether the procedure they are following under our guidance for prevention of malaria in their respective villages requires radical change or any modification, in view of these findings.

These works can be broadly divided into two classes :—

- (1) Research work carried on for its own sake not necessarily having any reference to field work.
- (2) Field work, based on fundamental truths discovered by research workers modified by the field workers' own findings in fields where economics have predominant share in shaping the policy, the workers being also in a position to evaluate the findings of research workers.

It is necessary to refer to a third class of workers with whom, we fully agree in disagreeing, but we refer to them as they copy the language of science, in expressing their views, as they do a certain amount of research work but as these workers do not know their own limitations and claim their work as the whole truth, to be adopted in

field work without any modification, not having even elementary knowledge of rural economics, they are actually hindering preventive work. They are like the numerous manufacturers of proprietary drugs, who claim the virtue of their respective nostrums, sale of which they want to push by copying the language of scientific men, the unwary patients and their relations are duped thereby. These nostrum—vendors or who are designated as quacks are preventing growth of true medical science. In fields other than medical, namely political, there are also men of similar type who claim that their doctrine will cure all the miseries of life and these have been mercilessly exposed long ago by Thomas Carlyle in his sarcastic writings in his celebrated book 'Sartar Resartus' as vendors of Morison Pill, at one time a well advertised drug in England which was claimed to cure all diseases.

Reference to these works, can again be divided into two classes, first, which deals with immunity, caused by the parasite in the human host and second, the well known method of prevention. by destroying the carriers of the parasite the mosquito, in their breeding place and destruction of the parasite in the human host by quinine.

### **Part I—Immunity Problem.**

It is necessary to mention, why this is incorporated in this work, meant for field workers, when it has not attained as yet any definite result by applying which we can solve the problem. The following are the two reasons (1) It has a chance of explaining why there are anomalies in the epidemiology of malaria (2) At some future date, discovery of immunity may prevent malaria, as has been the case with many widespread epidemic diseases, the parasite of which being not visible even under highest-power microscope, and so has not been cultivated nor the carrier known as yet, though they have been successfully prevented (as Small-pox in man, Rhinderpest in cattle to mention a few among many) by applying one principle or other of immunology. In order to make the lay reader understand the following resume, the following note is given to make explicit the writings. *P. vivax* is the parasite of benign tertian malaria. *P. falciparum* is parasite of malignant tertian malaria: autochthonous means originating from the locality, exotic means coming from outside. The study of malaria



parasite has been possible for the writers, as it is being inoculated into human beings suffering from a certain type of paralysis and has a curative power, so the parasite has been kept alive from man to mosquito and mosquito to man for years.

Boyd, Mark F., On Strains or Races of the Malaria Parasites.

The American Journal of Tropical Medicine.

Vol. 20, No. 1, January, 1940.

He found that immunological studies carried out on human subjects, through the opportunity afforded by malaria therapy, strongly indicate that within the defined limits of these specific morphological units, by which the recognised species of malaria parasites found in the human host are made out, minor groups may be distinguished through the varying immunological response evoked in the human host by parasites of the same species derived from different sources. To these minor groups he applied the terms strains or races.

Thus an original susceptible subject who experiences clinical recovery from an attack of malaria following inoculation by either trophozoites or sporozoites, (1) will not experience a second attack when successfully reinoculated with the homologous parasites, or parasites of the same species and line, which in the meantime had been concurrently propagated in another host.

This tolerance to the parasite may be considered as an early step in the acquirement of an active immunity and is a property that may be conserved for years. Since it is manifested against parasites of the same lineage as those which produced the primary attack, it may be referred to as an homologous immunity.

On the other hand, if such a convalescing human patient is reinoculated with either trophozoites or sporozoites of a presumably different lineage of the same species, *i.e.* of unimpeachable exotic origin, or even derived from another autochthonous local case, the probabilities

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(1) Trophozoite means the earliest form of malaria parasite found in the human system, after the introduction by the mosquito. Sporozoite means the form of malaria formed in the salivary gland of the mosquito.

favor that, in the event of a take, the patient will experience a clinical attack of malaria. The tolerance which the patient is expected to display on reinoculation with the homologous parasites is not manifested. So, we infer that it is of different lineage or heterologous. These are regarded as of heterologous value and so are constituted as different strains. Thus, in his laboratory with several strains of *Plasmodium vivax*, he has observed renewed clinical activity after cessation of the primary attack; ten times more often in patients inoculated with the McCoy strain than in those inoculated with other strains.

Infections following naturally effected inoculations with the Long strain of *plasmodium falciparum* are characterized by very constant incubation periods of from 9 to 13 days duration, while infections with the Coker strain of the same species had incubation periods which varied from 6 to 25 days. Furthermore, he has some unreported data which indicate that different strains of *P. falciparum* tend to vary considerably in their susceptibility to quinine.

These strains, both indigenous and exotic, have the following antecedents :

1. *P. vivax*, McCoy strain, was secured by a blood subinoculation made on May 21, 1931, since the strain has been in his hands, it has to date (August 1, 1939) been carried through 47 consecutive human-anopheline passages and has been inoculated into approximately 400 patients. It initiates clinical attacks of more than average severity without danger to the patient, is a reliable gametocyte producer, and produces frequent relapses.

2. *P. vivax*, White strain, was secured in 1935. It was propagated for five passages and discontinued. The clinical attack was mild and gametocyte production was undependable.

3. *P. vivax*, Wilson Dam strain obtained in 1936.

4. *P. vivax*, Mayo strain secured through Dr. H. B. Magath, who states that it was obtained about 15 years ago. Apart from the characteristics noted by strains of parasites derived from one faunal



region may show wide differences in the degree of adaptation they display to definitive anopheline hosts common to their own indigenous region, as compared with their adaptation to exotic hosts. It was noted that *A. quadrimaculatus* displayed a high susceptibility to both the indigenous and exotic strains of *P. vivax* and *P. falciparum*, while *A. punctipennis* was definitely less susceptible to the exotic strains of the parasites.

Under discussion he says :

James, Nicol and Shute in a comparative study of strains of *P. falciparum* derived from Rome and India, observed that the attacks produced by the latter were distinctly milder and more amenable to quinine. The usual duration of the periods of remittent fever was about twice as long in the former as in the latter. *Anopheles maculipennis* could be readily infected with the Italian, but not with the Indian strains. Giovannola and Mosna have reported some similar comparative observations on strains of *P. falciparum* from Rome and Ethiopia. Morphological differences, particularly in the pigment and gametocytes, were observed. The Ethiopian parasite presents a clearer pigment, while the gametocytes are small and stumpy. The observation of schizonts in the peripheral circulation of patients infected with the Roman strain, while unusual is nevertheless of grave prognostic significance; but on the other hand it is not uncommon in patients infected with the Ethiopian strain and in these is not alarming.

James and Ciuca gave a comparison of certain characteristics of two strains of *P. vivax* derived from Holland and Madagascar. Morphologically the mean number of merozoites produced at segmentation of the former is 13, and of the latter 18.

The extremely meager available knowledge would indicate the existence of an extensive and unpredictable number of strains of the species of malaria plasmodia. An adequate study of this subject cannot be undertaken until parasites derived from an extensive series of widely distributed patients can be assembled and conserved. A really practicable in vitro-cultivation technique or a method for their indefinite preservation in a latent condition is a pre-requisite.

He summarises his deductions from his other observation as follows :—

The observations discussed indicate that well-fixed subspecific varieties or races of two species at least of the human plasmodia are discernible immunologically. These differences in some cases are correlated with clear cut variations in the characteristics of the clinical infection. Meager observations suggest that some strains may have a localized habitat or geographical distribution.

Boyd, M. F., On the susceptibility of *Anopheles quadrimaculatus* to *Plasmodium vivax* after prolonged insectary cultivation.

Am. Jr. Tr. Med. Vol. XIX, 6, November 1939.

He found that the susceptibility of the race of *A. quadrimaculatus* maintained in his insectary for over 7 years, which are at least 84, generation removed from their wild progenitors, is essentially the same as that of contemporary wild individuals captured in the locality from which the progenitors of the colony were derived.

Russel, P. F., and Mahan, B. N., Experimental Malaria Infections in two races of *A. stephensi*.

*A. stephensi* (Liston) 1901 and *A. stephensi mysorensis*, Sweet and Rao 1937, bred from their laboratory, were easily and equally infected, experimentally by *P. falciparum* Welch 1897.

On the correlation between the incidence of stomach and gland infection in *Anopheles quadrimaculatus* infected with *Plasmodium vivax*.

Mark F. Boyd., American Journal of Tropical Medicine (2) No. 1, January 1940.

He comes to the conclusion that with large number of mosquitoes the incidence of infection revealed by stomach or gland dissection will be in substantial agreement.

Studies on the treatment experimental malaria infection with synthetic drugs compared with quinine sulphate.

by

M. Ciuca, L. Ballif, M. Chelaresco and M. Lavrinenko

(Bulletin of the Health Organisation)

League of Nations 1938.



They found the following strains of Benign Tertian which were kept up by passage from man to mosquito and then to man.

BT<sup>R</sup>102, BT<sup>A</sup>P, BT<sup>H</sup> from Madagascar. The comparative studies carried out with these strains have shown no variations with regard to the sensitiveness to different drugs.

## **Part II—Antilarval and antiparasitic Measures.**

Epidemiology of Malaria in the Pattukotai Taluk,

Tanjore District, Madras Presidency,

Paul F. Russel, F. M. Menon and T. R. Rao,

Journal of the Malaria Institute of India,

Vol. IV, 3, September 1938.

Pattukotai is a taluk in the Tanjore district of Madras Presidency. It is flat and free from forest. It averages 50 ft., higher than the deltaic portion of the district and was reputed never to have been malarious, prior to opening of an irrigation system. The cultivated portion is 26 p. c. which is increasing as irrigation water is available. The southern edge of the taluk borders on Palk Strait which separates it from Ceylon. Rain fall is 42 inches. The taluk is supplied with irrigation water from the Grand Anicut Canal which originates in the Cauvery river. Since 1933, it is functioning. There is no drainage canals provided for this irrigation system in the Pattukottai Taluk, so that excess water after meeting crop production accumulates in low-lying places. Some water finds its way into natural streams and so to the ocean.

As a result of irrigation, what was formerly a dry taluk, is more amply supplied with water and monetary values of lands and crops have been enhanced. But the subsoil water level has increased considerably, so that districts formerly dry for most part of the year now contained water during the irrigation season.

According to the Gazetter and local unanimous testimony, this taluk until 1933 was free from malaria and as a result of their investigation they found *A. culicifacies* breeding chiefly in the irrigation water. It was found to be the only carrier. The rest *A. aconitus*,

*A. annularis*, *A. barbirostris*, *A. hyrcanus* Var, *A. nigerrhimus*, *A. subpictus*, *A. vagus*, *A. jamesi*, *A. pallidus* and *A. vagus* while these were found there and dissected, none found to be carrier.

Some of their conclusions are as follows :—

1. Malaria was not important to public health prior to 1933, but it has now become of widespread importance.
2. It is transmitted chiefly by *A. culicifacies*.
3. Spleen index of the taluk was over 40%.
4. The malaria is traceable to the effects of the Irrigation System.

*Note* :—No suggestion was made by the writers how malaria was to be eradicated.

#### THE ANOPHELES OF RICEFIELDS IN SOUTH-EASTERN MADRAS.

BY

Paul F. Russell and H. Ramanatha Rao.

Journal of the Malaria Institute of India, III, 4, December, 1940.

The data presented in the paper by the authors were collected in Pattukkottai Taluk of Tanjore District, in South-Eastern Madras. Due to access of irrigation water, on account of Cauvery-Mettur Irrigation Project, it has not only brought about a relatively great increase in wet cultivation, especially of paddy, but has, unfortunately, brought malaria to the taluk through the vector *A. culicifacies*, a species that thrives in irrigation water. They made some experiments with intermittent irrigation to rice fields to find out whether incidence of vector (*A. culicifacies*) breeding has any influence on this method of irrigation. The result arrived at is not very convincing this way or the other.

#### THE SPECIES CONTROL OF HILL-STREAM BY TRAINING.

BY

R. S. Mondal,

Journal of the Malaria Institute of India, III, 4, December, 1940.

A river named Sandyl in the Jeypore Hills, is a hill stream which falls into the Tel River, a tributary of the Mahanadi. It is a boulder-



strewn, sometimes sandy rivulet. It has been taken up by the writer for his experiment of anti-malaria work, by species control. As he found it extremely difficult to oil the river, without preliminary training, he found that breeding of anopheles was much less after this training without oiling. He came to the conclusion that some type of anopheline grows along grassy edges others among tree roots and others again in sands and in boulders, but this is not absolute as it appears from his paper. So, it is difficult to understand how this study of species carried by a field worker, will help him in his preventive work, for which he has been employed.

The Institute of Malariology  
of

Aguas de Mura (Portugal)

(Revue du Paludism, May 1940).

Following the enquiry organised in the country in 1933 by the Director-General of Public Health of Portugal in collaboration with the Rockefeller Institute, was created in 1934 in Aguas de Moura, a small village, a small station under the name of "Estacao para Estudo du Sezomismo", for Study of the problem particularly from preventive side (sezomismo means malaria in Portuguese language) outside the villages serving as control.

After the enquiry, of 1933 there was a belief current among the malariologists of Portugal that rice fields were the source of malaria which breeds *Anopheles maculipennis*.

As the number of rice field increased, the spleen index increased to 80 p. c.

For this reason, the station was well chosen and importance of the little observation station increased.

It started to be visited by medical men of antimalarial service.

In 1937 it was transformed into Institute of Malariology by the advice of the representative of the Rockefeller Foundation. The Government accepted the proposal and contributed money. The Institute was started in 1938.

In 1939 a course of malariology was started for medical men.

In Portugal, malaria prevails mostly in alluvial plains of principal rivers.

#### THE PROPHYLAXIS OF MALARIA IN ITALIAN SOMALILAND.

BY

Onofrio Giovenco.

(Revue du Paludism, May 1940).

The prophylaxis consists of distribution and ingestion per day per man of the army 5 cachets of 0.20 Grms. of bisulphate of quinine (3.5 grains) (2 midday and 3 in the evening) each Saturday and 8 cachets (2 morning 3 midday and 3 evening) each Sunday during whole of the period of sojourn of the detachment in malarial zone.

This prophylaxis is to be continued during two other months after transfer of the regiment to non-malarious zone.

The control of ingestion is made by personal inspection and by finding out the quinine in the urine by Tanret's test.

In the regiment there was found none who cannot tolerate quinine.

If any, atebirin or plasmoquinine (Bayer) was used.

#### MALARIA AND WAR.

BY

Sir Aldo Castellani

(Professor, London School of Hygiene and Tropical Medicine)

(From Revue Medical Francaise Extreme—Orient, November 1939, No. 9).

The campaign against malaria in Ehtiopia comprised from 3rd October 1935 to 9th May 1936. In the north among a number of zones, the region of March, was seriously infected with malaria, and on the south whole of the region was terribly infected, the disease was widespread in the indigenous Somali population. With an army



of 500,000 men (comprising an important force of military workers), there was during the period of war, 1241 admissions in the hospitals for primary attacks of malaria and 1093 admissions for relapses with 23 deaths from pernicious forms, including haemoglobinuria, which is extremely rare.

If we refer to the operations which were undertaken in Africa during the war of 1917-18, there was a large number of admissions in hospitals for malaria, with 2000 deaths. In the expeditionary force of East Africa, in 1916, the figures in the force of 500,000 men there was during the period of seven months from June to December, 15,768 in the hospital for malaria with 263 deaths. In 1917, the expeditionary force comprising 500,000 men, there were 72,141 admission for malaria with 499 deaths. Then regarding the expeditionary forces in Macedonia, malaria was a scourge. The forces of 1917 comprising 182,000 men, there was 71,412 admissions, in the hospital for malaria with 228 deaths. Most of the cases, notably 60,977 was produced during the seven months from May to November, which is in the Balkans the season of malaria. In equatorial Africa, one can say that the malaria season prevails throughout the year. The greatest loss by malaria, among the sufferers in Macedonia were the French and Italian forces.

What were the prophylactic measures taken during the Ethiopian forces? With a troop continuously on the move, on a zone of operation extending over huge area, the mechanical prophylaxis by mosquito curtain and antilarval measures were impossible. From the beginning, we insisted on prophylaxis by quinine, each soldier received 3 packets of sulphate or bihydrochlorate of quinine per day, each comprising 0.20 Grms ( $3\frac{1}{2}$  grains) being given to each man by the chief of the troops. At each meal, the commander of the force in Somali, Marshal Graziani, and all his chiefs took the quinine regularly. The men knew that we have the power to know for certain that they are absorbing the quinine effectually. For this were collected together, often 10 to 20 samples of urine. They were tested by reaction of Tanret—by addition a few drops of the reagent, if quinine has been taken, the urine becomes cloudy, if it has not been taken or absorbed, the urine remains clear.

The prophylaxis by quinine, is naturally a clinical prophylaxis. There may have been infection but no visible manifestation of the infection will occur. The soldier may be the reservoir of the parasite of malaria, but he is healthy and capable of doing service, and this again is most important from military point of view. (November 1938-39).

Studies on the Behaviour of *Anopheles minimus*.

Journal of the Malaria Institute of India.

Vol. III, Nos. 2 & 3. September, 1940.

BY

R. C. Muirhead Thomson.

(Research Worker supported by the Royal Society and the London School of Hygiene and Tropical Medicine).

(The research was carried out in Upper Assam).

## Part 1.

### THE SELECTION OF THE BREEDING PLACE AND THE INFLUENCE OF LIGHT AND SHADE.

(1) He says that one of the striking features of the breeding habits of anophelines in general is the restriction of many species to particular types of breeding place. In some cases this is well marked. In Assam, for example, continuous breeding of *A. minimus* has always been associated with the grassy edges of clear, unpolluted running streams, but this is not absolute.

For example he found them growing continually in October and November in still water with *A. aconitus*, *A. hyrcanus* or *A. barbirostris*, *A. vagus* and *A. kochi*.

(2) As regards time of oviposition he found that the maximum of oviposition takes place  $1\frac{1}{2}$  hour after sunset.

(3) As regards shade, he says during the long Assam rainy season from June till October, some of the most important breeding places of *A. minimus* are the grassy-edged open drains or streams with clear running water, which are so common in the tea gardens. For these

narrow drains during this season, one of the most effective natural methods of control is based on the observation that this mosquito is never found breeding in water shaded by dense jungle. It consists of shading these streams with hedges of various plants such as *Duranta*, *Eupatorium*, *Lantana*, *Titapat*, etc. (Ramsay, Ramsay & Meedonald). When these shading systems become well established, the breeding of *A.minimus* is eliminated, and the most well established, the breeding of *A.minimus* is eliminated, and the most dangerous breeding places are rendered harmless. The importance of sunlight and shade on anopheline breeding places has long been appreciated. In Malaya, *A.maculatus* like *A.minimus*, breeds in foothill streams from which jungle has been cleared; similar removal of shade in the coastal plains is unfavourable for *A.umbrosus*.

So the investigations were planned by the writer to find out how shade has unfavourable effect on breeding of *A.minimus*.

He first started finding out the action of shade or darkness on oviposition. He invented an instrument for measuring low light intensity or want of light at night, of such a delicacy that he could measure so small a light intensity as occurs in moonless night, when it was found out to be 0.00008 foot candle. (Compare this with ordinary electric bulb having 16 or 32 or 50 canddles power).

Then he selected a uniform stretch of drain for experiment where *A.minimus* was breeding continually, one part of which was shaded, the other part served as a control. After numerous elaborate experiments, he found out shade in itself is not unfavourable for breeding or repellant to *A.minimus*. In fact, the reverse seems to be the case—shaded portion was much more attractive than the control. Then he found after numerous field experiments, details of which are given in the paper, the vegetation at the edge is necessary, besides the shade, for attracting mosquito to lay their eggs. Bare edge prevents breeding and this again due to promotion of the rapidity of flow of water. From several experiments he came to the conclusion that clearing away the grass from the edges and exposing the banks to sunlight puts an immediate end to all breeding.



But it is a fact that dense shading can eliminate the vegetation at the edge. Whether it will be economical to do by it, or cleaning the edge will be more economical, that is a different matter, into the discussion which he did not enter.

So the conclusion is that the thick grassy edge not only provides shade attractive to mosquito, but acts as a powerful break water and produces a zone of still water along the edge.

So immediate effective control may be brought about in all breeding places by the complete removal of all vegetation at the edges and the full exposure of the bare edges to light.

## **Part 2.**

### THE INFLUENCE OF WATER MOVEMENT ON THE SELECTION OF THE BREEDING PLACE.

He found out that in the edges in running water where there is grassy edge, the velocity is almost nil. Though breeding is associated with running water, the larvae live in practically still water in the grassy edge.

Shade by itself is no factor in preventing breeding, rather it helps breeding but if it succeeds destroying vegetation in the edge, it increases velocity of water at the edge, thereby it prevents breeding.

## **Part 3.**

### THE INFLUENCE OF WATER TEMPERATURE ON THE CHOICE AND SUITABILITY OF THE BREEDING PLACE.

He found as a result of elaborate experiments that a few minutes' exposure to 41°C was sufficient to kill all larvae (*A.minimus*).

Then he found maximum surface temperature of various water collections.

Of these temperature of ricefields for example is 41°.7 C.

The writer's main object in view has been to find out why a certain type of anopheline breeding place is constantly favourable for

*A. minimus*, while other types of water are seldom selected. The most outstanding example of this limitation of breeding place is the almost complete absence of *A. minimus* from shallow stagnant ricefields, and it appears that this finding can largely be explained by the single factor of water temperature. *A. minimus* larvae and pupae are more susceptible to the effects of high temperature than other anopheline, such as those which commonly breed in still or exposed collections of water. The figures recorded in Assam show that continuous breeding of *A. minimus* in stagnant ricefield will be impossible during the greater part of the monsoon, because the maximum water temperature repeatedly reach or exceed the thermal death point of the larvae.

The thermal death points for full grown larvae are as follows :—

<i>A. minimus</i>	...	...	41°.0C
<i>A. hyrcanus</i>	...	...	43°.0 to 43°.5C
<i>A. barbirostris</i>	...	...	43°.5C
<i>A. culicifacies</i>	...	...	44°.0C
<i>A. vagus</i>	...	...	44°.5 to 45°.0C

He found the maximum water temperature of typical *A. minimus* running water breeding place seldom exceeds 35°.0C.

So in order to judge from the above resume of literature on the subject of malaria, which is by no means complete, but showing in what direction research work is being conducted, we can say that study of immunity can not give any help at present in prevention of malaria, as has been the case with Smallpox or Cholera in human beings or Rhinderpest in the case of cattle, though it may help to explain why flaring up of epidemics of malaria takes place in endemic malaria area, possibly due to means of transport having been increased recently, new strains of malaria parasites are brought to a place, in spite of the people there are more or less immunised to the local strains, so had very little malaria hitherto.

Leaving aside this portion to be worked out by research workers, we come next to the question of carrier, prevention of breeding places of which is the chief plank, on which antimalaria societies depend for prevention and which is up to now the cheapest and so can be easily

carried out by the villagers, with prospect of real and permanent success. In this, we depended so long on non-species sanitation *i.e.* we wanted to prevent breeding of all mosquitoes, whether carrier or non-carrier, as opposed to species sanitation advocated by so called *species sanitarians*. A discussion on the point is desirable whether according to species sanitarian's idea that we had been all along wrong in our endeavour or that though success has attained so far our efforts, the expense would have been less and our effort would have lead to more uniform success, if we followed their methods, by antilarval being modified by knowledge of the breeding habits of carrier mosquitoes which differ widely. For this discussion we will state our case as succintly as possible and our supposed opponents' case and draw conclusion, so that the reader can judge whether we are correct in our deduction or not. First of all we from the beginning of our movement took for granted that all mosquitoes irrespective of species lay their eggs in stagnant collections of water, where there is vegetation, as the development of the larvae can only take place there undisturbed and protected from depradation by their natural enemies present in abundance in most collections of water in the plains, such as small fish. In running water if found, they are likely to be washed away and be destroyed by these enemies before they can become imagine (adult mosquito) which takes a good number of days (10 to 15 days) from the egg stage to do so. So we advise cleaning the edges of all stagnant collections of water, of which there are endless number in the shape of tanks, dobas etc., in deltaic Bengal—the big rivers and rivulets so long they are running, never breed anopheline and so are left undistributed. To the advice of species sanitarians who draw their inspiration from finding the dangerous *A.minimus* breeding in running streams, in foot hills of Assam to make shade in the tanks or other water collections streams and rivers) when the surface is exposed to sunlight and not found breeding in shaded streams, we had turned a deaf ear so long on the ground that *A.minimus* cannot be found in the plains of Bengal. But since then finding by the research work by Thompson quoted above that *A.minimus* even is not an exception to the rule, that all mosquitoes breed in stagnant water. It selects running streams, not because it breeds only in running water, but because it prefers breeding in cooler water than the rest of the carriers—in



natural running stream it is found that water is cooler than in shallow pools, such as rice fields, but it grows there even in the grassy edges of the streams where there is no current. As Thompson found removal of grassy edges and exposing it to direct sunlight, will make it impossible for *A. minimus* to breed, this makes us carry our fight in our antagonists' quarter, asking them whether it is economical to take to untidy process of shading the streams by growth of vegetation, with the possibility that grass will grow in the edge or clean out outright the shade as well as the grass in the edge and make the place tidy. So in the plains as well as in the hill streams our field works can be carried on without any change, ignoring altogether the distinction between the breeding habits of different species, which we think is more or less of academic interest.

In this connection one instance of meaningless propaganda by the species sanitarians is given here to show the mischief they are doing by creating scare (a). Though it refers to a bygone period it is given in this years' report, as the excavation of the Satkhira Khal, which is a branch of the big estuary Rai Mongal coming up from Bay of Bengal, and its subsequent connection with the excavated sweet water Nowkhali river which extends into the interior of the Satkhira and Kalarooa Thanas in the Khulna District was completed five years back, for which the local antimalaria societies take justifiable pride. This has lead to the marked diminution of malaria incidence over the whole area. This connection of the Nowkhali river with the Satkhira Khal was however opposed, when first proposed by this society some 10 years previously, by the then Executive Engineer, who took the cue from the species sanitarians that as *A. ludlowi* breeds in saline water, the excavation of the Nowkhali and connecting it with the tidal Satkhira Khal will introduce saline water and will lead to *A. ludlowi* borne malaria spreading into the interior of the Khulna district which the species sanitarians designated as a different malaria, being much more vicious than the malaria carried by sweat water breeding mos-

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(a) As a result of the scare of ludlowi malaria which is supposed to be a dreadful malaria carried by saline water which was given a wide publicity under blood curdling headlines, in one of the leading English daily newspapers of Calcutta, the buildings of the Port Commissioners, meant for accommodating higher class officials, near the Khidderpore Dock Yards became vacated at that time.

quitoes which is prevalent there as intensely as possible. Fortunately for this country, sane view prevailing among the authorities, this connection has been made and the tides are going up as high as Kalaroa. Navigation has improved and malaria has diminished markedly. It is to be seen that even if it be proved that *A. ludlowi* is a much better carrier of malaria parasites, which is a fact, than the sweet water mosquitoes (there is no such thing as *ludlowi* malaria) the Engineer did not know that it breeds also along with other anopheles in stagnant collections of saline water free from fish and not in esturine current water. If that was the case, England would have been depopulated by *ludlowi* malaria.

The only change, which we want to introduce into our method, is that when there is intense outbreak of malaria in the village where a society is situated, we find that if a treatment centre be started, for treating malaria cases with effective doses of quinine, the epidemic can be very rapidly brought under control—the amount of quinine which has to be used does not amount to much, if antilarval measures have been already adopted with more or less thoroughness—it is otherwise the case where no antimalaria measures have been taken. The second modification which we want to introduce is a more ambitious one. If many of the drainage channels, which are part of the tidal rivers or connected with these and which have got access even now to lowlying beels, which have not been filled up as yet, are obstructed by cross bunds and fishing contrivances by fishermen, there is no chance of these marshy beels being ever filled up, and so will remain potential source of breeding of anopheles, removal of which is beyond the power of a village society. The Irrigation Department who are supposed to be incharge of these channels, feel helpless in the matter to prevent this action of the fishermen, due to paucity of their officers, so the only way by which, we have found up to now, we can help the department in keeping these channels free from obstructions is by creating anti-malaria societies, the members of which will do their level best to prevent fishermen putting up obstructions. Since then, we are organising Co-operative Fishermen's Society, where the right to catch fish in the channel, if it be a government property, will be handed over to the society on condition they will catch fish by throw nets or

drag nets only and not by putting up any fixed fishing implements and they will also see that no such obstruction is put up by any one (details given in the appendix). A third venture we have adopted for a long time and which has been mentioned in the previous report what is termed *Overflow Irrigation of Willcocks*, regarding upland rivers where overflowing during the rainy season helps to fill up the surrounding low land by the silt brought down by the river during the rainy season. We not only advocate but practise through the societies, removal of longitudinal bunds, put up by the people or the Government Department either for preventing flooding the rice fields together with the holdings of poor people situated in this lowlying area. In consonance with this policy, we try also to educate the people and create public opinion opposing the adoption of the suicidal Irrigation Policy now in force throughout India, in non-deltaic, presumably hitherto non-malarious area, where this irrigation system made by impounding rivers, putting up a water tight cross anicut as it is called, with elaborate mechanisms, for shutting off all water from getting into its own bed, during non-monsoon season, and passing the water through their own cut channel with elaborate system for cutting off connection to particular areas, or allowing water to the field of a particular cultivator who pays the price for the water. Admirable as it is for improving cultivation, but ignoring altogether the biological factors which save us from ravages of mosquito borne malaria which breeds in all impounded water, where fish, the natural enemy of mosquito larvae do not get access and get facilities for breeding, are creating havoc, in those places, as can be testified by the above quotation from independent research workers in Pattokottai Taluk. The writers, it is necessary to add, are blaming the authorities for not providing for draining away the water which has been introduced into the area through those irrigation channels, which if done they think malaria will be prevented. It is necessary to state that they even suffer under a confusion of ideas in spite of their high attainments, as they found *A. culicifacies* breeding in the very water of the irrigation channel, so we cannot make out how only draining away the excess water will prevent malaria when the impounded irrigation water itself is the breeding place. The writer has seen recently a river named the Ken in the Banda district of Central India, where this system of irrigation has



been put in force. The bed of the river is a rocky one. It is kept almost dry for greater part of its length by an anicut higher up near its source laying bare huge boulders scattered throughout its bed below the anicut but where water trickling through some low portion of the anicut, passes into its bed. It is creating millions of ideal anopheline breeding places, throughout its length of nearly 100 miles, which only because it is uninhabited is not producing malaria but will produce at one time or other terrible malaria when it becomes populated. The writer had occasion to examine the fish population in the reservior above the anicut and found some of the ordinary types of carp fish, habits and method of breeding of which are well known. This reservoir being unconnected with the main river below, namely the Jamuna, will not get supply of spawning fish in no time. (See appendices 3 & 4).

Lastly, finding that interest which we have created in the small fish in their power of devouring larvae of mosquito, a study has been taken up in the laboratory of the Zoology Department of Calcutta University, aided by grants from the Imperial Council of Agricultural Research. To help in this study, we started on our own account, copying the methods adopted in America, by people called aquarists, who simply for hobby's sake, have cultivated large number of small tropical fish, in small glass acquaria where water weeds have been grown, to give oxygen supply and artificially fed by daphne and cyclops. This attempt has given us an insight into the breeding habits of a large number of our well known fish. As a result, the males and females of *Haplochilus*, *Barbus conchoni* and Zebra fish, have been identified and we can cultivate them in acquaria. Among the exotic fish which are viviparous (give birth to young ones) are available to us for stocking any tank, the following are available :—Moon fish, *Gambusia* and Barbados millions.

Now, about our actual work during the year under report. As our main function is not to carry on antimalaria work but to tap local enthusiasm and to try to create as many co-operative antimalaria public health societies in the villages of Bengal who are to carry on antimalaria work on approved scientific lines, by their own funds, we

do it, by advising those who approach us, teaching them how to do it, followed by, if they showed earnestness, going to their villages or simply giving instructions by correspondence or attending conferences in some remote districts of Bengal, where the people are taught how to form societies and work in a co-ordinated way. But this plan has been curtailed very much mainly due to paucity of our funds, secondly because large number of Government paid officers in the shape of Sanitary Inspectors, being stationed throughout Bengal in charge of Rural Health Circles in Thanas, we found it much easier to create societies through them. As the increase in the number of societies is very great, we are however unable to give the exact figures as large number of societies formed get defunct and they get rejuvenated again some times later. As a good number of these are registered under the Co-operative Societies Act, we get information through the audit reports which are sent to us. But there is also difficulty there as the auditors are officers of the Co-operative Department they are not under any obligation to us to carry on this work, so we do not get audit reports of all the societies and that regularly.

One word about the policy which the Government adopted when Dr. C. A. Bentley was the Director of Public Health, of giving monetary help from the Government's fund to be doled out to the District Boards which had to allot at least half the amount from their own fund, who used to pay to the rural antimalaria societies, through the Union Boards. This policy, we found, had its effect that the Health Officers and their staff of the District Boards used to take interest in the antimalaria work carried by the societies and also they used to undertake themselves antimalaria work on approved lines. Since the last three years, this grant is not being paid. As we have no part in initiating the policy, so we are not justified in complaining why the policy was reversed. All that we can say that the prevention of malaria of the province as a whole has suffered a severe set back. A series of figures in the appendix (5) will show that from correspondence with all the District Boards that they have ceased to allot any sum for antimalaria work, even on their own account. As due to paucity of funds, they are not in a position to look after, even their roads and bridges.

A word of advice in the way of encouragement to the rural societies. It is to be remembered that most of the infectious diseases, which cause widespread epidemics in Bengal, have been controlled ---such as kala-azar, small-pox and cholera by the application of knowledge of prevention discovered by science, being applied to by the net work of public health organisations created through the local bodies, aided by intelligent help of voluntary workers. But malaria which causes the greatest amount of mortality and suffering, its depredation would be 4 or 5 times the combined mortality of all the epidemic diseases not leaving aside even tuberculosis, is as yet an unsolved problem, though its method of prevention is well known. Not only that, man made malaria is increasing, being caused by people in authority such as the powerful Road Board with crores of rupees at their disposal and the department responsible for the keeping of tidal rivers in proper condition, the first body constructing roads by making huge number of ideal anopheles breeding pools along the roads for taking earth and the second party by allowing the lands in the tidal zone to be settled with cultivators before they have risen above the highest flood tidal level, so ring embankments leading to bowl shaped depressions in the settled area bringing in a condition for producing widespread malaria, as in Backergunge, is going on apace.

So, not being daunted by this unhappy state of affairs in this country, we would tell them, that as most of the village societies have been more or less successful in prevention of malaria in their respective villages, they will serve as an object lesson to the powerful but ignorant vested interest, to show the right way for improving the condition of the country, brought about by malaria which at present seems insoluble to the government officials (See appendix).

Keeping your eye stead fastly on the aim, irrespective of what others may say, I conclude my paper by a quotation from a verse by Doctor poet Oliver Wendell Holmes where the poet points out that the pilot of a vessel is to keep his eye stead fastly how to pilot the vessel safely through dangerous sea, not thinking of what shoremen, safe in their place, may think of him.



## Sun and Shadow.

As I look from the isle, O'er its billows of green.  
 To the billows of foam-crested blue.  
 Yon bark, that afar in the distance is seen,  
 Half-dreaming, my eyes will pursue :  
 Now dark in the shadow, she scatters the spray  
 As the chaff in the stroke of the flail ;  
 Now white as the seagull, she flies on her way,  
 The sun gleaming bright on her sail.  
 Yet her pilot is thinking of dangers to shun,—  
 Of breakers that whiten and roar ;  
 How little he cares, if in shadow or sun,  
 They see him that gaze from the shores !  
 He looks to the beacon that looms from the reef,  
 To the rock that is under his lee,  
 As he drifts on the blast, like a wind wafted leaf,  
 O'er the gulfs of the desolate sea.  
 Thus drifting afar to the dim-vaulted caves  
 Where life and its ventures are laid,  
 The dreamers who gaze while we battle the waves.  
 May see us in sunshine or shade ;  
 Yet true to our course, though our shadow grow dark,  
 We'll trim our broad sail as before,  
 And stand by the rudder that governs the bark,  
 Nor ask how we look from the shore !

Oliver Wendell Holmes  
 (The Autocrat of the Breakfast table).

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# Statement of Accounts

OF

## The Central Co-operative Anti-Malaria Society Ltd.

(Registered Number 215 dated 5th July, 1919).

*For the year ending 30th June, 1940.*

### NUMBER OF MEMBERS.

(a) Individuals	...	...	...	49
(b) Societies	...	...	...	11

### Cash Accounts.

<u>RECEIPT.</u>	Rs.	A.	P.	<u>EXPENDITURE.</u>	Rs.	A.	P.
1. Loans, Deposits & Investments recovered.				1. Investments.			
(a) B. P. C. Bank Ltd.				(a) B. P. C. Bank Ltd.			
Current A/c ...	19,535	11	8	Current A/c ...	19,609	14	6
(b) B. P. C. Bank Ltd.				(b) Govt. Promissory Note ...	9,906	12	0
Fixed Deposit ...	12,000	0	0	2. Kala-Azar ...	2,101	3	0
2. Interest ...	3,085	11	3	3. Cost of managements.			
3. Contribution received.				(a) Establishment... 3,840	0	0	
(a) Contribution				(b) Printing ... 334	5	0	
Govt. Rs. 2,300	3,123	0	0	(c) Electric Charges ... 105	12	9	
Others ,, 823				(d) Stamp & Stationery 166	1	9	
(b) Kala-Azar ...	1,000	0	0	(e) Miscellaneous ... 27	15	6	
4. Other items.				4. Anti-Malaria Propaganda Works.			
(a) Sonar Bangla ... 294	2	0		(a) Propaganda ... 942	8	6	
(b) Printing ... 20	0	0		(b) Sonar Bangla ... 1,188	11	6	
(c) Subscription ... 15	0	0		5. Other items.			
(d) Dairy account				(a) Inteeest ... 99	5	8	
(by sale of milk) 538	12	0		(b) Suspense ... 200	0	0	
(e) Suspense ... 200	0	0		(c) Price of 9 cows 1,230	0	0	
(f) Miscellaneous ... 8	7	0		(d) Excess cost of feeding the cattles 79	14	3	
Total Rs. ...	39,820	11	11	Total Rs. ...	39,832	8	5
Opening balance Rs. ...	170	11	0	Closing balance Rs. ...	158	14	6
Grand Total Rs. ...	39,991	6	11	Grand Total Rs. ...	39,991	6	11

G. C. CHATTERJEE,

*Hony. Secretary.*

# The Central Co-operative Anti-Malaria Society Ltd.

## BALANCE SHEET AT 30-6-40.

### LIABILITIES.

	Rs.	A.	P.
1. Share ...	2,235	0	0
2. Donation ...	34,321	14	3
3. Tube well Account (Panihaty) ...	140	5	0
4. Reserve fund ...	11,700	0	0
5. Other items.			
(a) Antimalaria fund	7,371	11	3
(b) Anti Kala-Azar fund	6,472	8	6
(c) Building fund	5,000	0	0
(d) Propaganda fund	380	4	3
6. Cost of management due ...	320	0	0
7. Undistributed profit	7,097	12	6
1938-39 Rs. 11,108-11-9)			
1939-40     4,010-15-3)			
<b>Total Rs. ...</b>	<b>75,039</b>	<b>7</b>	<b>9</b>
<b>Profit of the year ...</b>	<b>1,731</b>	<b>15</b>	<b>10</b>
<b>Grand Total Rs. ...</b>	<b>76,771</b>	<b>7</b>	<b>7</b>

### ASSETS.

	Rs.	A.	P.
1. Cash in hand ...	158	14	6
2. Investments.			
(a) B. P. C. Bank, Ltd.			
Current A/c ...	1,803	0	11
(b) Govt : papers ...	72,363	15	0
(c) Post Office Savings Bank ...	7	11	11
3. Interest.			
(a) Govt : papers ...	1,411	12	0
(b) Interest on B. P. C. Bank, Ltd.			
Current A/c ...	16	1	3
4. Tube well Account	10	0	0
5. Stock Rs. 265/-			
Less depreciation	250	0	0
Rs. 15/-			
6. Cinema Film Rs. 25/-			
Less depreciation			
Rs. 25/-			
Price of 9 cows			
Rs. 1,230/-			
Less in revaluation			
Rs. 480/-			
Present value ...	750	0	0
<b>Grand Total Rs. ...</b>	<b>76,771</b>	<b>7</b>	<b>7</b>

Hira Lal Sinha, (*Vice-President*).

G. C. Chatterjee, (*Hony. Secy. & Hony. Treasurer*).

Tinkari Ghose, (*Director*).

Subject to my separate report of even date. I report that I have obtained all the informations and explanations I have required and I hereby certify that the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs, according to the best of my information and the explanations given to me, and as shown by the books of the society.

CALCUTTA,

Sd./- Satis Ranjan Biswas,

Dated, the 29th October 1940.

Auditor of Co-operative Societies, Calcutta.



# The Central Co-operative Anti-Malaria Society Ltd.

## PROFIT & LOSS ACCOUNT.

<u>LOSS.</u>				<u>PROFIT.</u>			
	Rs.	A.	P.		Rs.	A.	P.
Establishment	3,840	0	0	Interest	3,100	14	1
Printing	314	5	0	Contribution	3,123	0	0
Electric charges	105	12	9	Subscription	15	0	0
Stamp & Stationery	166	1	9	Profit in sale of milk	458	13	9
Loss due to revaluation	480	0	0				
Miscellaneous	19	8	6				
Depreciation	40	0	0				
	Rs. 4,965	12	0				
Profit	1,731	15	10				
	Rs. 6,697	11	10		Rs. 6,697	11	10

G. C. CHATTERJEE,

*Hony. Secretary.*

## Quotations.

"It is three hundred years, that one knows the remarkable curative effect of the bark of cinchona in malaria, and of quinine, as also of the other active alkaloids derived from the bark, but of general use not more than four score (80) years.

The massive doses of quinine are more efficacious than moderate small doses repeated several times".

The Therapeutics of Malaria, Quarterly Bulletin of the Organisation of Hygiene of the League of Nations).

\* \* \* \* \*

By the number of deaths which it produces malaria is the most serious of scourges affecting the health and happiness of people.

Hoffman. Second Scientific Panamerican Congress, 1928.

\* \* \* \* \*

Whether malaria is the greatest cause of mortality of Indians there cannot be any doubt.

**Christopher.**

Considering the terrible mortality due to malaria and the vast tract of country which it covers, I believe that I am right to state that it is the greatest and serious national problem."

**Banerjee.**

# Statement of Accounts

OF

## The Central Co-operative Anti-Malaria Society Ltd.

*Cash account from 1st July 1940 to 31st December 1940.*

	Rs.	A.	P.		Rs.	A.	P.
<b>B. P. C. BANK, LTD.</b>				<b>B. P. C. BANK, LTD.</b>			
Current A/c	...	3,808	13 9	Current A/c	...	2,119	9 3
Contribution	...	100	0 0	Establishment	...	1,920	0 0
Sonar Bangla	..	111	12 0	Kala-Azar	...	791	6 3
Kala-Azar	...	1,000	0 0	Sonar Bangla	...	737	5 6
Interest	...	883	9 3	Printing	...	20	10 0
Subscription	...	24	0 0	Propaganda	..	283	6 3
Loan realised	...	125	0 0	Stamp & Stationery	...	65	9 0
Deposit	...	100	0 0	Loan	...	125	0 0
Miscellaneous	...	1	12 0	Electric charges	...	24	0 0
				Miscellaneous	...	16	8 9
	Rs.	6,154	15 0		Rs.	6,103	7 0
Opening balance	„	158	14 6	Closing balance	„	210	6 6
	„	6,313	13 6		„	6,313	13 6

### Contributions received by the Society.

*From 1st January 1940 to 31st December, 1940,*

1. Royal Calcutta Turf Club	...	Rs.	705	0	0
2. Director of Public Health, Bengal—					
(a) Kala-Azar grant	...	„	1,000	0	0
(b) Anti-malaria grant	...	„	2,300	0	0
3. Chairman District Board, Hooghly	...	„	50	0	0
4. Babu Ramdas Mukherjee (Uttarpara)	...	„	15	0	0
5. Babu Anil Chandra Ghose (Panihaty)	...	„	30	0	0
		Rs.	4,100	0	0

**Opinions.****I.**

Extracts from the Annual Report on the Working of Co-operative Societies in the Presidency of Bengal for the year ending 30th June 1931

**Higher Co-operative Organisations.**

The Central Co-operative Anti-Malaria Society, Ltd.—This society under the inspiring guidance of Rai Bahadur Dr. G. C. Chatterjee, who is the founder Secretary of the central society, continued to do good work on the lines indicated in the last annual report. The number of registered societies affiliated to the Central Anti-Malaria Society rose from 683 to 769. These societies are scattered all over the province but owing to want of sufficient resources the Central Anti-Malaria Society has not been able to take up any responsibility on itself for financing or even of supervising these societies. It devoted itself to propaganda work with a view to further development and to giving a lead to the well-managed among the existing societies to shoulder greater responsibility by combining with neighbouring societies and pooling their resources for the purpose of fighting and controlling preventable and epidemic diseases and supplying medical aid to those attacked with such diseases. With a view to achieving these objects the Central Anti-Malarial Society organised a series of conferences at several centres in the province for the neighbouring groups of societies. It also continued to publish a journal in Bengali called the “Sonar Bangla” devoted to the dissemination of useful knowledge regarding sanitation, public health and agriculture, and the publication of reports and reviews of work done by the primary societies and their method of work. With a view to securing the supervision of primary antimalarial societies, particularly those situated in outlying areas, an attempt was made to get these societies affiliated to the local Central Banks but the response has been disappointing.

These Anti-Malarial and Public Health Societies have generally been doing much useful work within their respective areas. They have assisted considerably in fighting malaria and other preventable



diseases. The inception and development of this section of the movement is mainly due to Rai Bahadur Dr. Gopal Chandra Chatterjee who has laid the province under a debt of obligation by his work in this connection.

## II.

Aske,  
Richmond,  
Yorks.

DEAR DR. MITRA,

Please accept my thanks for your courtesy in sending me the last report of the Central Co-operative Anti-Malaria Society. I am delighted to think that such good work is in progress against the scourge of malaria.

With all good wishes,

Yours sincerely,  
Sd./- ZETLAND.

To

Dr. A. N. Mitra,  
*Joint Secretary,*

The Central Co-Operative Anti-Malaria Society Ltd.

## III.

INDIAN ADULT EDUCATIONAL CONFERENCE.

PROVISIONAL COMMITTEE.

Dated Lahore, the 11th October, 1939.

To

Rai Dr. G. C. Chatterjee, Esquire,  
Central Co-operative Anti-Malaria Society Ltd.,  
1-2A, Precchand Boral Street, CALCUTTA.

DEAR MR. CHATTERJEE,

Thank you for your letter of the 5th October. I mentioned your work in our third bulletin because I feel that public health propaganda

is one of the essentials of any real Adult Education, and I want to take every opportunity of impressing this on the people who are doing Adult Education work.

I have requested our Delhi office at No. 23, Darya Ganj to send you copies of the first and second bulletins as requested. I trust these will reach you in due course.

I sent recently a notice of the next conference which I hope you will be able to attend at Bhagalpore on the second and third December.

Yours sincerely,

Sd./- H. B. RICHARDSON,

*Hon. General Secretary,*

*Government College,*

*Lahore.*

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## **RESOLUTIONS.**

The following resolutions were passed at the last Annual Conference held at Albert Hall, Calcutta on 23rd March 1940.

### **1. ANTIMALARIA GRANTS FROM GOVERNMENT AND DISTRICT BOARDS.**

Proposed by :—Sahid Mia, (Chowara Banipore, Tippera).

As on account of divergence of principles among the various political bodies of the Provincial Assembly, the work of the antimalaria societies is suffering in a large number of places on account of distribution of antimalaria grant through the District Boards and Municipalities. This conference proposes that the authorities be requested to arrange for distribution of grants to rural societies through the Central Co-operative Antimalaria Society, Ltd.

### **2. DRAINAGE OF RAIN WATER FROM RAGHUNANDAN HILL. (Tippera).**

Proposed by :—Sahid Mia, (Chowara-Banipore, Tippera).

The rain water from the Raghunandan Hill (Tippera) flows through the southern portion of Comilla sub-division and being obstructed by the Lall Math Hills submerges the crops in the plains every year.

Resolved that the authorities be requested to cut a channel across the fields at the foot of Lall Math Hills for draining the water.

### **3. GRANTS TO ANTI-MALARIA SOCIETIES FROM DISTRICT BOARDS.**

Proposed by :—Sahid Mia, (Chowara-Banipore, Tippera).

It is resolved that requests be made to Government through the Central Co-operative Antimalaria Society for giving some grants to those anti-malaria societies where the District Boards have not made any provision for giving such grants.



## 4. RESUSCITATION OF Khardah Khal (24 Parganas).

Proposed by :—Babu Tarapada Sen (Natagore, 24 Parganas).

(1) Resolved that the Superintending Engineer, Southern Circle, Irrigation Department, be requested to take up the re-excavation work of the Khardah Khal without any further delay, as it was decided by the District Magistrate as President of the anti-malaria conference held at Sukchar on the 26th November 1939 that the said department would be put in charges of all necessary works for such re-excavation.

Further resolved that the Irrigation Department, the District Magistrate and the District Board be informed that it is high time now to commence the necessary works of silt clearance, removal of obstructions etc., from the Khardah Khal, which has almost silted up all through.

(2) Resolved that the Chairman, District Board, be informed that the removal of the flap shutters below the culvert on the Pran Krishna Biswas Road at Khardah for which he has already issued orders, has not been done as yet and he be requested to take necessary steps for their immediate removal, as they are mere obstructions to the free flow of tides either way through the khal.

## 5. RESUSCITATION OF THE PASHKALI KHAL (24 Parganas).

Proposed by :—Babu Kunja Behari Roy (Sardarati, 24 Parganas).

The Pashkhali Khal, a tributary of the Haroa Gang, connected with the Dhokra Beel, is the only drainage outlet of about 300 villages within Baraset and Habra Thanas. There being a cross bundh at the mouth of the khal in the southern end of the Dhokra Beel, the poor cultivators around the beel suffered most due to the obstruction and approached the Government for redress. The Irrigation Department have declared the said khal under the Embankment Act on 11th July 1936 with a view to remove the bundh and other obstructions but unfortunately the said bundh has not been removed as yet. If there be any difficulties in removing the said obstruction on the strength of that declaration, it is resolved that the bundh be removed immediately by declaring the khal under the Bengal Development Act or some other

Act in order to drain the beel and relieve the miseries of the cultivators around the beel.

6. NOWKHALI-BHAIRAB PROJECT (Khulna—24 Parganas).

Proposed by :—Babu Amulya Charan Banerjee (Madhabkati,  
Khulna).

Seconded by :—Babu Patiram Roy, M.L.A. (Kanthaltola, Khulna).

In order to introduce sufficient flood water into the Betna and its distributory branches, the Noakhali and the Sonai, and flush them properly with water from the Mathabhanga, through the Bejoy Cut at Joynagar and the Bhairab, connection of the Betna with the Bhairab be established at an early date at Mahespore (Jessore) and the old bed of the Betna be cleaned of silt for  $1\frac{1}{2}$  miles from its offtake.

7. DISTRIBUTORY NO. 12 OF DAMODAR CANAL.

Proposed by :—Babu Panchkowri Hati (Rampore, Burdwan).—

The Government made a survey for excavating the distributory No. 12 from 3rd branch of the Damodar Canal which flows eastwards to the north of Sahibgunge and to the south of Eruar but unfortunately this project was abandoned as some places within Sreepore, Sayer and Rampore villages were comparatively high. But if that distributory canal be cut, Sreepore, Debpore, Rampore, Sayer, Chandra and Ausgram villages will be flushed and the excess water will drain easily into the Kunnoor river whereby the people of the locality will be greatly benefitted in respect of malaria and agriculture. The cultivators of the locality are prepared to pay irrigation cess at Rs. 2-9-0 per acre. Resolved that the proposed cannal be excavated by the Government.

8. RESUSCITATION OF THE KUNNOOR RIVER (Burdwan).

Proposed by :—Babu Panchkowri Hati (Rampore, Burdwan). -

(1) The Kunnoor river (which flows within 2 miles north of Rampur village) offers great obstructions to drainage as it has silted up at places and has been overgrown with jungles on either side.—For remedying

this, its resuscitation is absolutely necessary. This poor society requests the authorities of the Irrigation Department, District Board and the Collector to see that the clearance work be taken up at an early date and the attention of the Central Co-operative Anti-malaria Society is drawn to this matter.

(2) The small tanks and dobas within village are cleaned by the local society but the big tanks (area 4-7 acres) having been overgrown with jungles are causing serious damage to the health of the people and clearance of these big tanks is beyond the resources of the local society. Resolved that the Government and the District Board be pleased to make some grants to the society for keeping the tanks clean.

#### 9. THE SONAI-ICHHAMATI PROJECT (Jessore & 24 Perganas).

Proposed by :—Baidyanath Dalal, (Sonabaria, Jessore).

Seconded by :—Babu Patiram Roy, M.L.A. (Kanthaltola, Khulna).

The khal connecting the Dacopa Beel with the Sonai, having silted up in course of time, the water of Jhapghat, Sonabaria, Madra, Chand and other villages cannot drain properly into the Dacopa Beel and on account of this the incidence of malaria has increased very much in that locality. If the said Khal be properly re-excavated, the health of these villages and of many neighbouring villages will surely improve. Resolved that the khal be re-excavated as early as possible.

#### 10. SONAI DRAINAGE PROJECT.

Proposed by :—Babu Baidyanath Dalal.

Seconded by :—Mr. Patiram Roy, M.L.A.

If the western mouth of the Sonai now terminating at Chanduria be connected with Ichhamati through Barali, Danrka, Sultanpur and other villages, a large portion of the water of Sonai would drain easily into the Ichhamati during the ebb tides. Resolved the channel be properly excavated to effect the drainage of the Sonai to a considerable extent.



# 11. GOVERNMENT GRANT TO CENTRAL CO-OPERATIVE ANTIMALARIA SOCIETY LTD.

Proposed by :—Babu Sailendra Nath Banerjee

(Bhadrakhali, Hooghly).

Seconded by :—Mr. Patiram Roy, M.L.A. (Kanthaltola, Khulna).

The Central Co-operative Antimalaria Society has been trying to eradicate Malaria, Kala-Azar, Cholera and other preventible diseases and to improve the public health of rural areas with the co-operation of the local people for the last 20 years but as it has now become very difficult for the society to carry on this huge task with the small grant from the Government and meagre subscriptions and donations from the public. This conference proposes that the Bengal Government be pleased to make an annual grant of Rs. 50,000/- to the Central Co-operative Antimalaria Society for carrying on this work.—

## 12. DAMODAR-HOOGHLY FLUSHING SCHEME.

Proposed by :—Babu Amarendra Nath Mukherjee,

(Member D. B. Hooghly).

Seconded by :—Babu Dwijendra Nath Dutta,

Devanandpore, Hooghly).

In view of the rapid decay of the villages in the districts of Burdwan, Hooghly and Howrah, this conference urges upon the Government of Bengal not to delay any further in taking up the Damodar-Hooghly Flushing Scheme and to be serious about providing necessary funds for giving effect to the same as early as possible.

## 13. GOVERNMENT GRANTS TO RURAL ANTIMALARIA SOCIETIES.

Proposed by :—Babu Dwijendra Nath Dutt,

Devanandpore, Hooghly).

Whereas the Government of Bengal, on the plea of financing big antimalaria schemes in the different districts of Bengal, have stopped the grants to rural antimalaria societies which were and are doing good antimalaria operations in the interior villages, this conference urges

upon the District Boards, Union Boards and Municipalities to provide sufficient funds in their budgets for giving regular financial aid to these rural antimalaria societies and to actually disburse such amounts in course of the financial year.

#### 14. DISTRICT BOARD GRANTS TO ANTIMALARIA SOCIETIES.

Proposed by :—Md. Monzul Islam Chowdhury,  
(Bajitpore, Malda).

The antimalaria grant to the societies from the District Boards having been stopped for the last few years, antimalaria work is not being done properly at the present moment. Resolved that the District Boards be pleased to give grants to the antimalaria societies from this year from their own funds in order to enable the societies to carry on the work properly. Further resolved that a copy of this resolution be forwarded to all District Boards in Bengal and to the authorities of the Public Health Department and to the Minister-in-Charge of the Public Health Department.

#### 15. RESUSCITATION OF THE GHEA RIVER.

Proposed by :—Babu Narayan Chandra Paul (Palasi, Hooghly).

Palasi is a very old and prosperous village within Dhanikhali Thana, district Hooghly. About 50 years back there were about 300 families within the village but at present these have been reduced to 80 or 90.

The Ghea River, which flows by the side of Palasi formerly had connections with the two big tanks within the village by separate channels and the river used to flush these tanks during the floods, and the water of these tanks was then used for drinking purpose by many people. During the last 30 years the river has silted up and has been converted into paddy fields at certain places. The channels connecting the river with the tanks having been silted up, the tanks have become insanitary and a source of disease to the village. It is resolved that the Government and the District Board be pleased to make adequate grants to the society for resuscitation of the tanks and their connecting channels and be pleased to keep a vigilant eye on the channels to keep them clean.

## 16. DANKUNI DRAINAGE CHANNEL (Hooghly).

Proposed by :—Dr. Tustoo Charan Ghose (Panchghora, Hooghly).

The Dankuni Drainage Channel which passes through the Dankuni Beel (Serampore, Hooghly) and opens into the Hooghly at both the ends, used to serve as a drainage channel for about 150 villages around the beel. The channel having silted up, the crops in major portion of the beel are destroyed every year due to stagnation and on account of improper drainage, the incidence of malaria has increased immensely in the villages around the beel.

Resolved that the khal be cleared of silt and deepened properly for effecting drainage quickly.

Further resolved that for draining the adjoining Chandaler Jala (1,000 bighas) the Bengity—Jagannathpur khal be resuscitated properly for connecting the said low land with the Dankuni Drainage Channel on one side and with the Bagher Khal on the other side for effecting proper drainage.

## 17. INTRODUCTION OF FLOOD WATER INTO SHELIMABAD (BURDWAN) FROM THE DAMODAR, FOR FLUSHING.

Proposed by :—Mv. Sakhawat Hossain (Shelimabad, Burdwan).

Seconded by :—Sk. Eunash (Shelimabad, Burdwan).

Resolved that for eradicating malaria from the village, steps be taken for flushing the Shelimabad village on the Damodar, in Thana Jamalpur, (Burdwan) by flood water from the Damodar by cuts in its left bank or through the sluices and the scheme for such flushing which has been submitted by the local society to the Director of Public Health be given effect to at an early date after joint discussion with the authorities of the Irrigation and Public Health Departments.

## 18. RESUSCITATION OF THE BETNA (Jessore).

Proposed by :—Dr. Satis Chandra Chatterjee,  
(Jadabpore-Kristopore, Jessore).

Seconded by :—Babu Patiram Roy, M.L.A., (Kanthaltola, Khulna).

The villages on either side of the Betna are being depopulated since the river has silted up. In spite of antimalaria works carried out



by the local societies, the Jadabpore and Krishnapore villages on either side of the said Betna river are going to be depopulated. Without resuscitation of the said river there is no other way of eradicating malarial from the locality. Resolved that in order to establish a flow of flood water in the Betna from the Bhairab near Maheshpore, a channel  $\frac{3}{4}$  miles long ought to be excavated in the bed of the Betna from its head at Maheshpur for introducing the flood water of the Padma through the Bhairab. We draw the attention of the Government to this matter through the Central Co-operative Antimalaria society.

#### 19. DECLARATION OF THE SONAI UNDER DRAINAGE ACT.

Proposed by :—Babu Subal Chandra Sarkar,

(Bithari, 24-Perganas).

Seconded by :—Babu Patiram Roy, M.L.A. (Kanthaltola, Khulna).

The Sonai river which forms the boundary between Khulna and 24-Perganas, suffers badly from obstructions to drainage. Resolved that in order to prevent obstructions in the Bithari Boar, Sonai river, Sreerampore, Bhomra and Saratkhal khals and for effecting proper drainage, the whole area be declared under the Drainage Act at an early date.

#### 20. OBSTRUCTION OF DRAINAGE OF DUM-DUM AREA (24-Perganas).

Proposed by :—Babu Sailajlal Chatterjee (Nimta, 24-Perganas).

This conference draws the attention of the Public Health and Irrigation Departments to deterioration of public health of the Dunm-Dum area which is due to not providing adequate passages for the drainage of the area including the Birati Khal, the Bagjola Khal etc., during the construction of the Calcutta Chord Railway.

#### 21. KHALIAR BEEL. (Pabna).

Proposed by :—Babu Nishi Bhusan Mitra (Kadamtoli, Pabna).

The Khaliar Beel (100 acres) being low, water used to accumulate there and the surrounding villages used to suffer from malaria due to

congestion. In order to drain this water, the Kadamtoli society excavated a canal through Golokekhalī village, but some people of Badai village have put up cross-bunds across the channel and have thus obstructed the drainage. A civil suit has been instituted at Pabna and an injunction has been issued by court on the Society for this and the Society has been put to an expense of nearly Rs. 300/- for this. The channel has been inspected by officers of the Irrigation Department in the mean time. Resolved that steps be taken to effect drainage of the beel by removing the obstruction in the said channel at an early date as otherwise incidence of malaria in the locality will be increased.

## 22. SALIA BEEL. (Pabna).

Proposed by :—Babu Nishi Bhusan Mitra (Kadamtoli, Pabna).

The Salia beel (400 bighas) is situated on the west of Kadamtoli. In order to drain the beel, the local society excavated a channel to connect the beel with Beel Gandahasti; the channel having been silted up in course of time, the health and agriculture of the people of that locality has been jeopardised. Resolved that the channel be re-excavated and deepened and the Government and the District Board authorities be requested to make suitable grants to the society for carrying on the work.

## 23. KEDARMATI RIVER. (Hooghly).

Proposed by :—Mr. K. K. Chatterjee (Chandpore, Hooghly).

The Kedarmati river originates from the Ilisura river of Burdwan district and passes through the Rameswarpur Union Board of Pandua Thana and empties into the Kunti in Polba Thana of Hooghly district. The off take the Kedarmati river having been silted up and converted in many places into paddy fields, low lands and beels and fishing contravances having been put up in its bed by the local zemindars and presidents of Union Boards and the bed of the river being leased out for fishery, the river is deteriorating day by day and the health and agriculture of the people of the locality is suffering greatly. Mr. Hartley, I.C.S., a former Collector of Hooghly tried to resuscitate the bed of the river.

Resolved that in order to take full advantage of the Damodar-Hooghly-Flushing scheme for improving the health and agriculture of the people, all obstructions such as bundhs and batas be removed at an early date and the bed of the river be resuscitated properly.

Chandpore, Prosadpur, Rameswarpur and other villages situated on the other portion of the Kedarmati river are trying to re-excavate that portion the bed of the river and they hope to complete the work before the ensuing rains for which they have received some grants from the Government.

#### 24. ILSURA RIVER (Burdwan).

Proposed :—Mr. K. K. Chatterjee (Chandpore, Hooghly).

The Ilsura river at present originates from the Eden Canal near Chanchai (distributory No. 2) and ends in village Sura of Burdwan district. If the sluice gates of the distributory No. 2 of the Eden Canal are opened, water of the Damodar can flush the villages on either side of the river and thus there is a chance for the improvement of the health of those villages; but owing to various obstructions in the bed of the channel by the zamindars for various purposes this cannot be effected.

Resolved that the authorities be pleased to remove all such obstructions in the bed of the river and to send down sufficient quantity of water through the channel by opening sluice gates in the Eden Canal from time to time.

#### 25. DHUSI RIVER (Burdwan).

Proposed by :—Mr. K. K. Chatterjee, (Chandpore, Hooghly).

The Dhusi river used to flush the western portion of the Hooghly district by flood water from the Damodar, which has been prevented since distributory No. 1 of the Eden Canal has been constructed at its mouth. A wall obstructing the channel has also been erected in Amalmouri village within Barala-Bochkhali Union of Pandua Thana, for which water of the Dhusi cannot flush the area in the lower portion of the Pandua thana and so malaria is raising there and devastating the villages. Many tanks having been excavated in the bed of the



river which are obstructing the flow in the river, the outfall of the Kunti river has been silted up for want of sufficient flow as the Dhusi and its other tributaries have silted up. The villages of Harnal-Daspur, Rameswarpur-Gopalnagore, Jayer-Dwarbasini, Simlagarh-Bhitasin, Pandua, Beloon-Dhamasin, Itachona-Khanyan and other Union Boards have been seriously affected on account of this.

Resolved that attention of the Government be drawn to remove obstructions in the bed of the Ilsura, Kedarmati and Dhusi rivers in order to bring back health and prosperity to the villages of the locality.

**APPENDIX 1.****Fishermen's livelihood *vs.* Malaria Problem in Bengal.**

The are about 6 lacs of fishermen in Bengal. From those in the trade who may be called small fries, who catch fish by throw nets living a precarious life to big wealthy persons living on fish business, who themselves do not catch fish but who owning big bheries, situated in the shallow, unfilled stretches of water, extending over hundreds and thousands of acres, connected with tidal rivers, earning lacs of rupees, catching fish through their employees by putting up fixed contrivances across the tidal channels which feed the bheries, there are endless varieties, in this deltaic Bengal. Their rights, descending from father to son, connected as they are with their living, having the sanction of usage of long standing cannot be taken away, by any legislative enactment, or by the authorities even if they find that their action is prejudicial from the public health point of view leading to choking of the drainage channels. These rights are called Birtees. Even if it be proved that their method of fishing is leading to diminution of fish, in the channels, on which they depend for their living, it is very difficult to approach them to make them understand it, so that they will change their method of fishing, as they do not form any trade guild, being disorganised, being under the thumb of non-fishermen middleman, who trade on fish caught by the fishermen, they taking away the lion's share of the profit. So the only way these men can be assured of their earning, and at the same time to change their habits, is by forming co-operative fishermen's society. To approach the private owners of fisheries, all of them without exception are big zemindars, to form such a society, amongst their tenants, is a hopeless task. Only in the case of crown fisheries, if the officials in charge of them be approached in the proper way, we can solve the problem, firstly (1) by increasing the fish stock in the fisheries and so giving them more chance of earning (2) prevention of putting up bandals, which tends to choke the rivers (3) bring them out of the clutches of non-fishermen middlemen who finance them. So we have created this type of society.

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**APPENDIX 2.****Drainage problem of the marshes or beels.**

In deltaic Bengal, there are endless number of these unhealthy unpopulated beels or shallow depressions situated in the midst of thickly populated places, area of some of which are several square miles, which during dry season, get either dried up completely or leave here or there shallow pools of water breeding any amount of mosquitoes, and which during rainy season become vast sheets of water, often overgrown with weeds like water-hyacinth. These are endless sources of malaria and lead to choking up of streams, which are connected with these, being neither solid land meant for living nor deep lakes to be used for fisheries. The only way to utilise them, is cultivation of rice, in the shallow portions which are not likely to be flooded during rainy season. As the flood tends to destruction of the crops so petitions after petitions are being sent by the local people to the Government from time immemorial to make these shallow sheets of water, fit for cultivation by preventing this flooding. In former days, the Government policy termed Drainage Scheme of such a beel was dictated solely for bettering the condition of the place from cultivators' point of view. It invariably amounted to putting up automatic doors costing lacs of rupees in case of the beels situated in the tidal regions, of which the majority are, for not allowing the flow tides, often containing saline water to flood the area, which are doubly injurious first due to excess of water and secondly due to salinity and allowing the gates to open out during the ebb tide to allow the rain water to come out. This policy admirable as it is from cultivators' point of view but not taking into account the silt with which the tidal water is surcharged, it getting deposited in the drainage channel outside the gates and not inside the beels blocks up the exit of the drainage channel, while the beel area gets deeper and deeper as time goes on due to scouring action of clear rain water, frustrating thereby the intention of the engineers. The beels become in time so many cups or saucers shaped depressions in midst of the surrounding raised land. Reversal of the policy, which the present day engineers are willing to lend their help but as this is likely to go against the long standing vested interest of the cultivators, who oppose it, so the only way to get out of the difficulty is by propa-



ganda work to do away with the sluices convincing people of ultimate benefit which will accrue to them. This is the genesis of the Dankuni Co-operative Fishery and Agriculture Society, in which at least the vested interest of the fishermen who used to catch fish in the government drainage channel, by putting up fishing bars has not been interfered with or rather improved and this has been done in the following way and from the cultivators point of view allowing the drainage channel to function, by the automatic removal of bandals put across the channel by fishermen. So the department can get an opportunity of the sluice doors not to function at all. The right to catch fish in the drainage channel, is given to this society directly instead of giving it to a wealthy middleman, not engaged in catching fish who on getting the right from Government, sublets to numerous fishermen allowing them the right to put up bandals across the channels, the middleman by this single stroke gets 5 to 6 times the amount he pays to government, without doing anything. In the new system, the society's members give an undertaking that if they put up the bandals, they will be turned out from membership. They are to catch fish by throw nets only, the amount which they earn being more than what they used to get under the old system.

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### APPENDIX 3.

TRUE COPY.

P.O. Dihipara, (Bankura),

Dated 7. 12. 1939.

S. C. Chatterjee,  
President,

Dihipara Union Board.

Asst. Headmaster,

Palashdanga H. E. School.

To

The Hon : Secretary,

The Central Co-operative Antimalarial Society,  
Calcutta.

Dear Sir,

In reply to your letter No.M/197 of 30-11-39, I beg to state, the following for your information.

From the very first year of opening the canal at Rondiha, the fishermen of all classes in general, living on the western part of the weir by the side of the river have been complaining that as fish can not cross the weir even in high flood, supply of fishes in the upper section of the weir has become very small. From my practical experience supported by the result of thorough enquiry from the fishermen in general I say that their statement is quite true taking the following facts into consideration.

1. All the fishermen (Keots, Bagdies and others) living on the western front of the weir have all along earned their livelihood by catching fish in the Damodar throughout the year, but since the construction of the weir they have been not doing so as practically no fish come up crossing the weir.

2. Women of the fishermen class earned much money in the rainy season by selling eggs caught by their nets, but as the supply of eggs are not now so abundant they earn very little. If big fishes

could come up crossing the weir the supply would never have been diminished.

3. Fishermen in the upper section caught innumerable hilsa fish from the month of Sraban to Kartic formerly but not a single hilsa fish is now caught by them as they can not come up crossing the weir.

4. Fishermen (innumerable number) gather on the eastern part of the weir and take lease at a daily rate from 2 to 4 Rs. for 4 months in the rainy season for catching fishes of all kinds close to the weir where they are found in abundant quantity. Even such a quantity of fish is caught that it is sold at a nominal price at times.

5. In any *dahas* (*pool*) formed in the bed of the river on the western front of the weir very little quantity of all kinds of fish is now caught by the fishermen from the month of Pous to Baisakh (next year). But formerly abundant supply of fish was got from them in those months. Its cause is the same as stated in 2.

6. The fishladders though are opened for a day or two during very high flood generally remain closed in other times.

7. Malaria has been raising throughout the year since last year but I have not been able to ascertain whether it is due to free drainage being obstructed by the weir.

Further to state, the bed of the river has been raised by about 2 cubits within the last three years as sands can not flow down freely due to permanent obstruction and the consequent result is that a little heavy flood in the river is now overflowing its banks and sands are accumulating on the fertile lands over the banks changing them into waste lands.

From the above statements you will see that the weir so far to speak has become a curse and menace to the people living on both sides of the river, on the western part of the weir extending over four miles and if no step is taken to remedy the wrong, people living in those parts shall be obliged to leave their ancestral homes to their great suffering and to their incurring unnecessary heavy cost in these hard days.

Yours truly,  
Sd/- S. C. Chatterjee.



**APPENDIX 4.**

TRUE COPY.

Dated, the 3-1-1940.

From

The President,  
Pakhanna Union Board,  
P.O. Palashdanga, District, Bankura.

To

Rai Bahadur Gopal Chandra Chatterjee,  
Secretary to the Antimalarial Co-operative Society,  
Government of Bengal.

Sir,

I have the honour to bring to your kind notice that Malarial Fever has been vigorously prevailing for the last two years in this Union as well as in other adjacent Unions bordering on the Damodar River. It is noticed that since the construction of a permanent wall across the said river by the canal department at Ranadiha (District Burdwan) malarial fever has made its permanent abode in the river side villages and it is gradually advancing in an epidemic form to the further west. In consequence death rate from Malaria has been considerably increasing year after year and the number as registered during the year 1939 for this Union alone is 164, against 71 in 1936 and 64 in 1937.

This tremendous increase of death rate in the opinion of the public is mainly attributable to the above mentioned wall which resists the natural and smooth drainage of the filthy silts. It is also observed that since the last few years the bed of the Damodar River is being gradually filled up causing the villages on both sides of it damp and swampy.

I earnestly pray that a thorough investigation be made into the matter at an early date and necessary measures be taken to rescue the distressed thousands of this dreadful epidemic.

I have the honour to be,  
Sir,

Your most obedient servant,

Sd/- Illegible,

President.

## Appendix 5.

*Replies to our letter dated 27th February 1940 to Chairmen of all District Boards regarding sanction of Antimalaria grants to Antimalaria Societies.*

No.	From whom received.	Letter No. and Date.	1936-37	1937-38	1938-39	1939-40	1940-41	REMARKS.
1	Chairman, D. B. Tippera	4842 G. 20-3-40	...	...	...	Nil.	Nil.	Nil.
2	V. C. D. B., Howrah	3955 G. 3-8-40	...	...	Will be considered for 1941-1942.	...	...	...
3	Ch. D. B., Khulna	12304 D. 5-3-40	...	...	Unable due to reduced income.	...	...	...
4	V. C., D. B., Faridpur	19907 G. 30-3-40	...	...	Cannot be paid for want of Govt. Contributions.	900 Nil.	Nil.	Nil.
5	Secy., D. B., 24 Perganas	23909 DB. 14-3-40	...	...	The Board may spend money if definite scheme is put up.	...	...	Yes,
6	V. C., D. B., Darjeeling	997 D. B. 30-4-40	...	...	The grants be continued for a couple of years.	...	...	Yes,
7	D. H. O., Midnapore	454 D. 12-4-40	...	...	Unable to continue the grant for shortage of funds.	...	...	...
8	D. B., Burdwan	146 G. 11-4-40	...	...	Inability for want of funds.	...	...	...

*Replies to our letter dated 28th November 1940 to all District Health Officers.*

9	D. H. O., Birbhum	2996 D. 16-12-40	...	...	1610 1025 Nil. 127-8 762-5 528 Nil.	Nil.	Nil.	Nil.
10	D. H. O., Hooghly	2588 D. 6-12-40	...	...	Nil. 1875	50 Nil.	Nil.	Nil.
11	D. H. O., Burdwan	3309 D. 4-12-40	...	...	Sent Sent	Nil.	...	...
					to to			
12	D. H. O., Khulna	7271 D. 20-12-40	...	...	DP H D P H	1600 800	...	...
13	D. H. O., Murshidabad	7401 D. 2-12-40	...	186-14	72-8	170 85	...	...
14	Secy., D. B., 24 Perganas	...	...	...	...	300 Nil.	...	Nil.
15	D. H. O., Jalpaiguri	6513 M.D. 5-12-40	...	No. Antimalaria Society.	...	Nil.	...	...
16	D. H. O., Bogra.	5202 (10-17) 5-12-40	...	...	...	Nil. Nil.	...	...
17	D. H. O., Rangpur	9841 D. 11-12-40	...	...	...	100 50	...	...
18	D. H. O., Malda	3771 D. 12-12-40	...	...	...	2432-12-0	...	550
19	D. H. O., Pabna	5519 D. 3-1-40	...	...	...	2428 263	...	Nil.
20	D. H. O., Dacca	5380 D. 6-12-40	...	...	...	Nil. Nil.	...	...
21	D. H. O., Mymensing	10195 D. 16-12-40	...	...	...	...	...	...
22	D. H. O., Noakhali	3652 D. 17-12-40	...	...	...	...	...	...

Through U. B.

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## How the Society's Funds are utilised.

(1) To carry on propaganda work. (2) To meet travelling expenses for organising Anti-Malaria and Public Health Societies in rural areas and to group them together. (3) To meet the expenses for running Kala-Azar Centres. (4) To publish SONAR BANGLA, the monthly bilingual organ of the Central Society, to publish the reports of the rural societies and to review the results of their activities and to circulate the journal among the rural societies, local and public bodies and various departments of Government.

N.B.—The Board of Directors frame rules from time to time about disbursement of the funds of the Society.

### *The following gentlemen presided over the previous Annual Meetings of the Society :*

- I. The Hon. Justice Sir A. Chowdhury, kt., M.A., *Bar-at-law* (since decd)  
on 16th April 1921 at the Rammohan Library.
- II. Mr. J. N. Gupta, C.I.E., M.B.E., I.C.S.  
on 29th April 1922 at the Indian Association Hall.
- III. Sir P. C. Ray, kt., C.I.E., D.Sc., on 29th April 1923 at the Overtoun Hall.
- IV. Dr. Rabindra Nath Tagore, N.L., D.Litt.  
on 23rd February 1924 at the Alfred Theatre.
- V. Dr. Sir J. C. Bose, kt., C.I.E., C.S.I., D.Sc., F.R.S. (since decd.)  
on 21st March 1925 at the Albert Hall.
- VI. Dr. Sir P. C. Ray, kt., C.I.E., D.Sc.  
on 24th April 1926 at the University Institute.
- VII & VIII. Dr. Sir Nilratan Sircar, kt., C.I.E., M.A., M.D., D.L.  
on 31st December 1927 at the Albert Hall.
- IX. Dr. Sir Malcolm Watson, kt., M.D., D.P.H., LL.D.  
Principal, Department of Malaria Control, Ross Institute, London,  
on 23rd February 1929 at the Albert Hall.
- X. Dr. W. A. P. Schueffner.  
President, League of Nations' Malaria Commission,  
on 26th October 1930 at the Albert Hall.
- XI. Sir Charles C. McLeod, bt. (since deceased).  
Chairman, Ross Institute, London,  
on 15th February 1931 at the Albert Hall.
- XII. Sir C. V. Raman, kt., D.Sc., F.R.S., N.L.  
on 20th April 1932 at the Albert Hall.
- XIII. Miss Josephine MacLeod.  
on 4th March 1933 at the Albert Hall.
- XIV. Sir Charles C. McLeod, bt. (since deceased).  
Chairman, Ross Institute of Hygiene and  
Governor, London School of Hygiene and Tropical Medicine on 18th February 1934.
- XV. Major General D. P. Goil, M.B., ch.B., F.R.C.S.E., K.H.S., I.M.S.  
Surgeon-General with Government of Bengal, on 27th April 1935.
- XVI & XVII. Major H. Lockwood Stevens.  
Organising Secretary, Ross Institute incorporated with the London  
School of Hygiene & Tropical Medicine, on 24th January 1937.
- XVIII & XIX. Miss Josephine MacLeod. on 21st January 1939.
- XX. Dr. Sir Malcolm Watson, kt., LL.D., M.D., C.M., D.P.H., F.R.F.P.S.  
Director, Ross Institute of Tropical Hygiene (London  
School of Hygiene & Tropical Medicine, University of London) on 23rd March 1940.



“**W**ITH regard to embankments, our experience has been that where ever they exist they have raised problems as great if not greater than those which they were intended to deal with; either in course of time they have raised flood levels or have led to the extinction of the rivers by causing silting and have brought about waterlogging and severe epidemics of Malaria and other diseases. It is significant that where the rivers are most active the people enjoy health and prosperity; the most malarious tracts are those in which the river system is composed of dead river beds encroached on by every sort of means and the country is in a waterlogged condition. I have examined a large number of cases in which works have been executed or are proposed, and I feel convinced that unless the questions are looked at as a whole further mistakes will be made.”

**C. ADDAMS WILLIAMS, C.I.E.**

*Late Chief Engineer, Irrigation Department, Bengal*

*From History of the Rivers of the Gangetic Delta (1750-1918)*

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“**W**E see them plagued with malaria and without any fish to strengthen them. We see them in the middle of dull surroundings, with nothing to take them out of themselves. Introduce the wholesale overflow irrigation which they had until 70 years ago, and you will have a physical, mental and spiritual resurrection. You will have the co-operation of all for the benefit of all, and this will at once add interest to their lives. They will wake up and find life interesting. They will find their old enemy malaria loosening its hold on them. They will have abundance of fish to eat, and they will see prosperous days before them and before their neighbours. In this prosperity and well being the Government will have its full share; and may God's blessing be with all those who help to bring this about.”

**WILLIAM WILLCOCKS, K.C.M.G.**

*(Ancient System of Irrigation in Bengal)*

Printed at the Criterion Printing Works, 8, Jackson Lane, Calcutta.

